UNITED STATES POSTAL SERVICE™

Automotive Electrical Systems

LLV ELECTRICAL SERVICE MANUAL

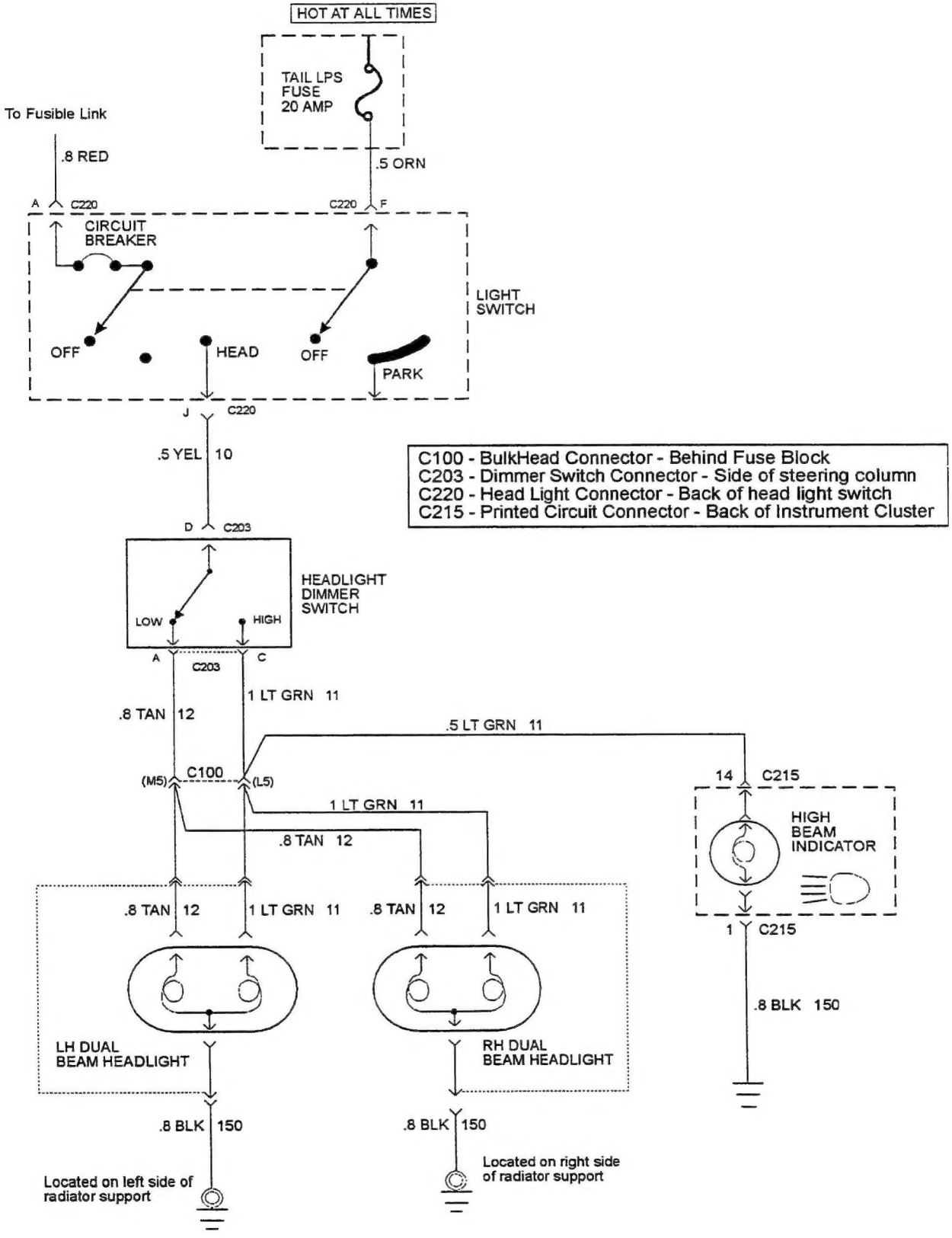
November 2002

EMPLOYEE RESOURCE MANAGEMENT
EMPLOYEE DEVELOPMENT

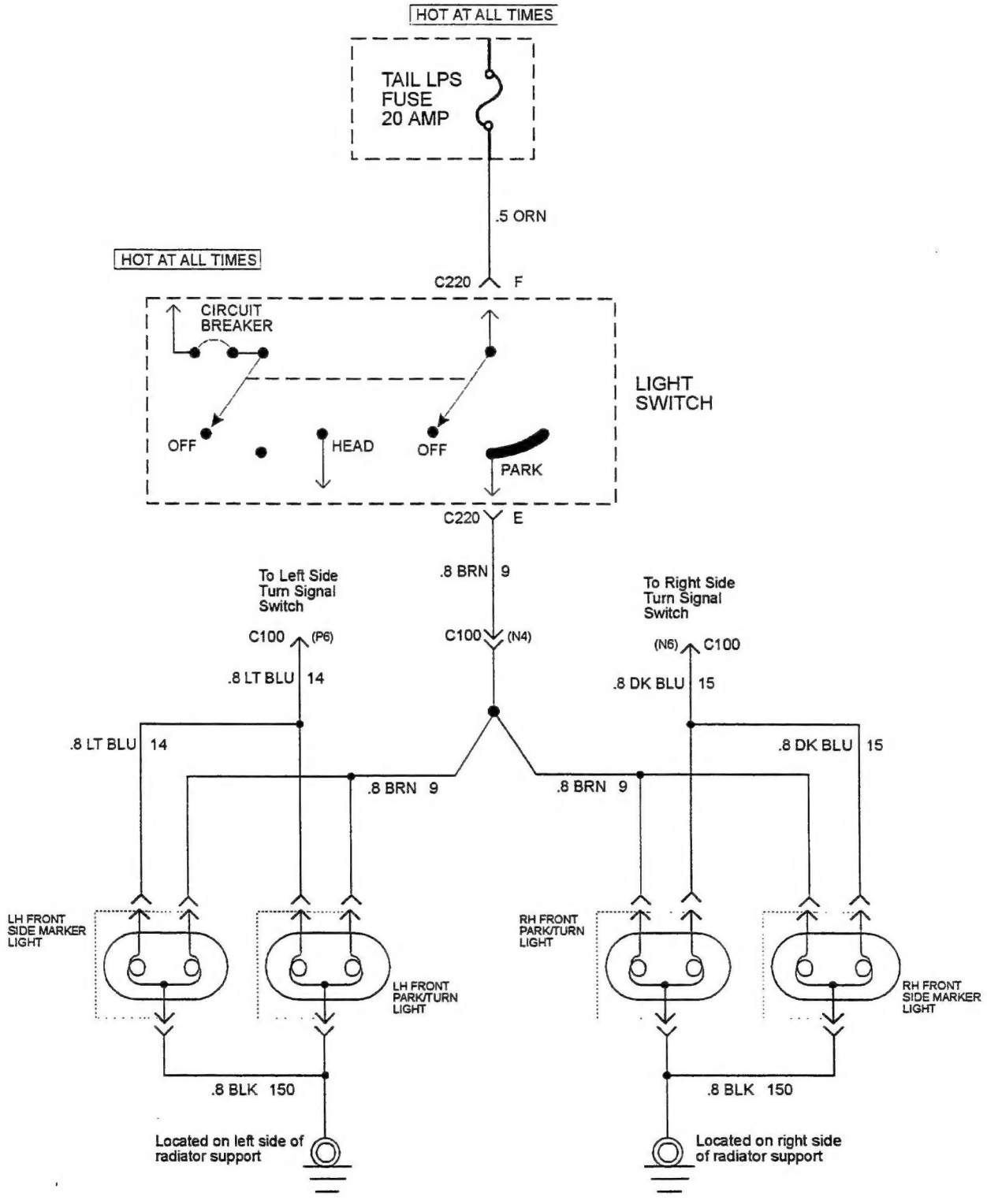
CONTENTS

PAGE

HEADLIGHTS

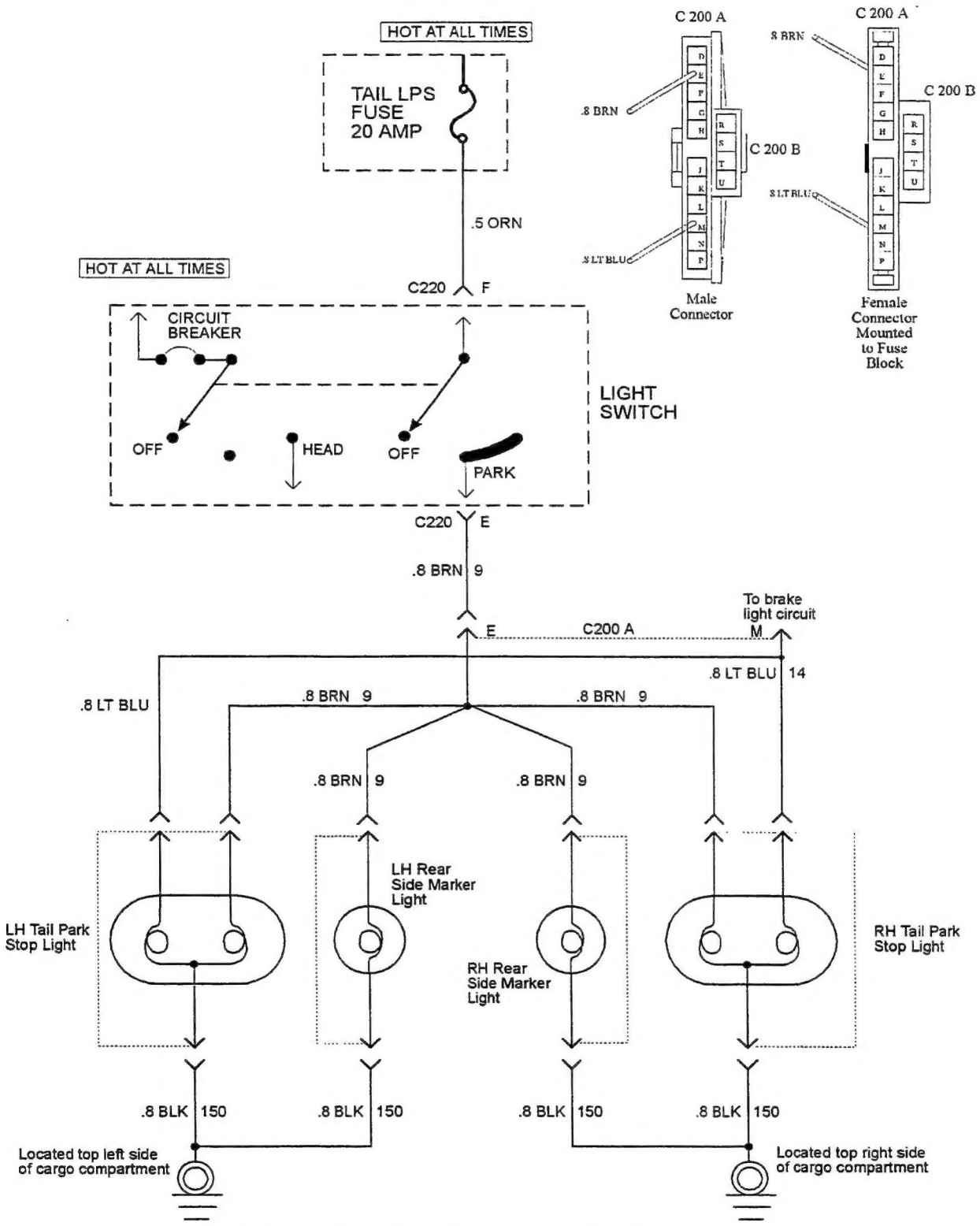

HOT AT ALL TIMES
TAIL LPS FUSE 20 AMP
To Fusible Link
.8 RED
.5 ORN
A C220
C220 F
CIRCUIT BREAKER
LIGHT SWITCH
OFF
HEAD
OFF
PARK
J C220
.5 YEL 10
C100 - BulkHead Connector - Behind Fuse Block
C203 - Dimmer Switch Connector - Side of steering column
C220 - Head Light Connector - Back of head light switch
C215 - Printed Circuit Connector - Back of Instrument Cluster
D C203
HEADLIGHT DIMMER SWITCH
LOW
HIGH
A C203 C
1 LT GRN 11
.8 TAN 12
.5 LT GRN 11
(M5) C100 (L5)
14 C215
HIGH BEAM INDICATOR
1 LT GRN 11
.8 TAN 12
.8 TAN 12
1 LT GRN 11
.8 TAN 12
1 LT GRN 11
1 C215
.8 BLK 150
LH DUAL BEAM HEADLIGHT
RH DUAL BEAM HEADLIGHT
.8 BLK 150
.8 BLK 150
Located on left side of radiator support
Located on right side of radiator support

FRONT PARK AND SIDE MARKER LIGHTS



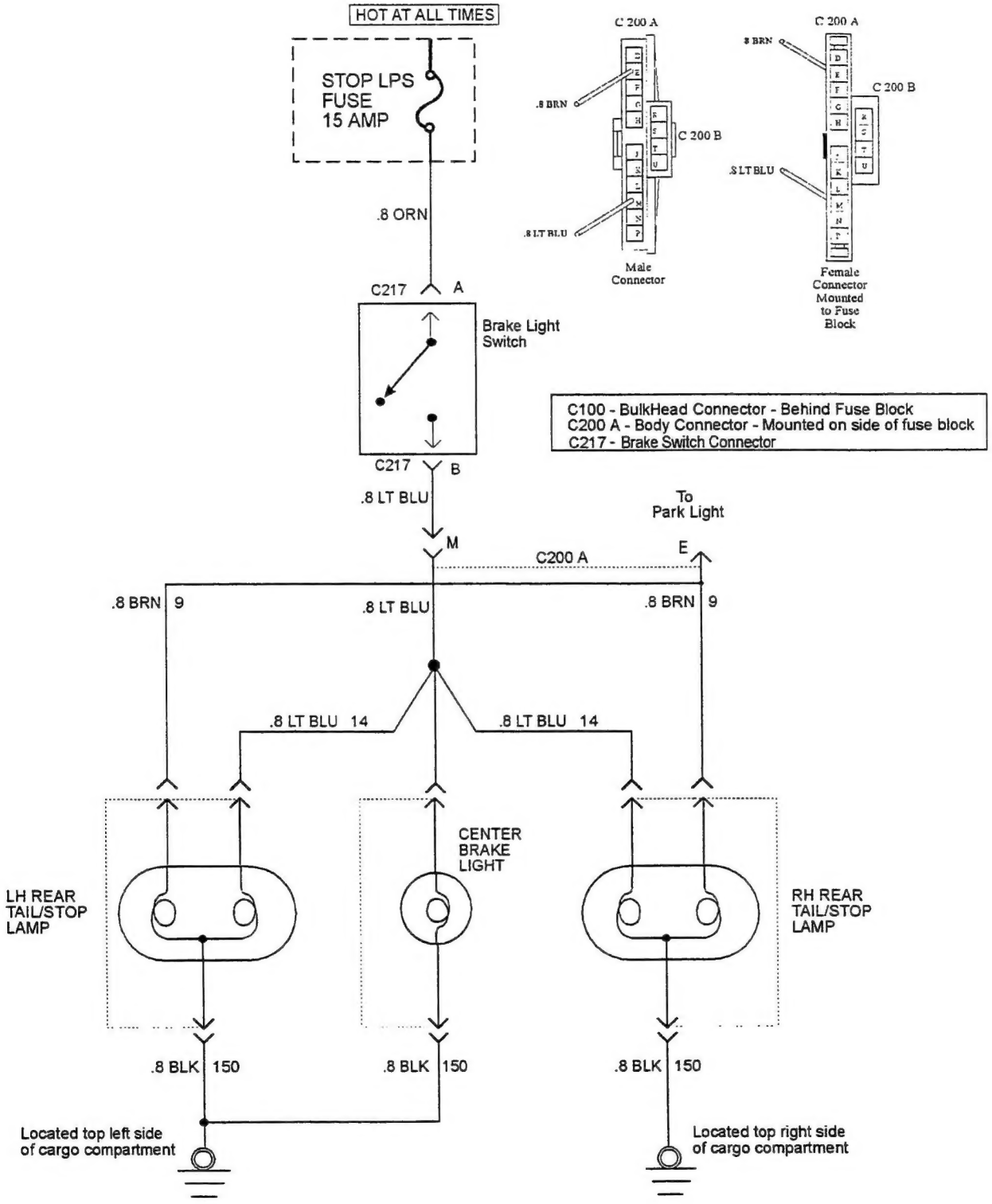
C100 - BulkHead Connector - Behind Fuse Block
C220 - Head Light Connector - Back of head light switch

REAR PARK AND SIDE MARKER LIGHTS

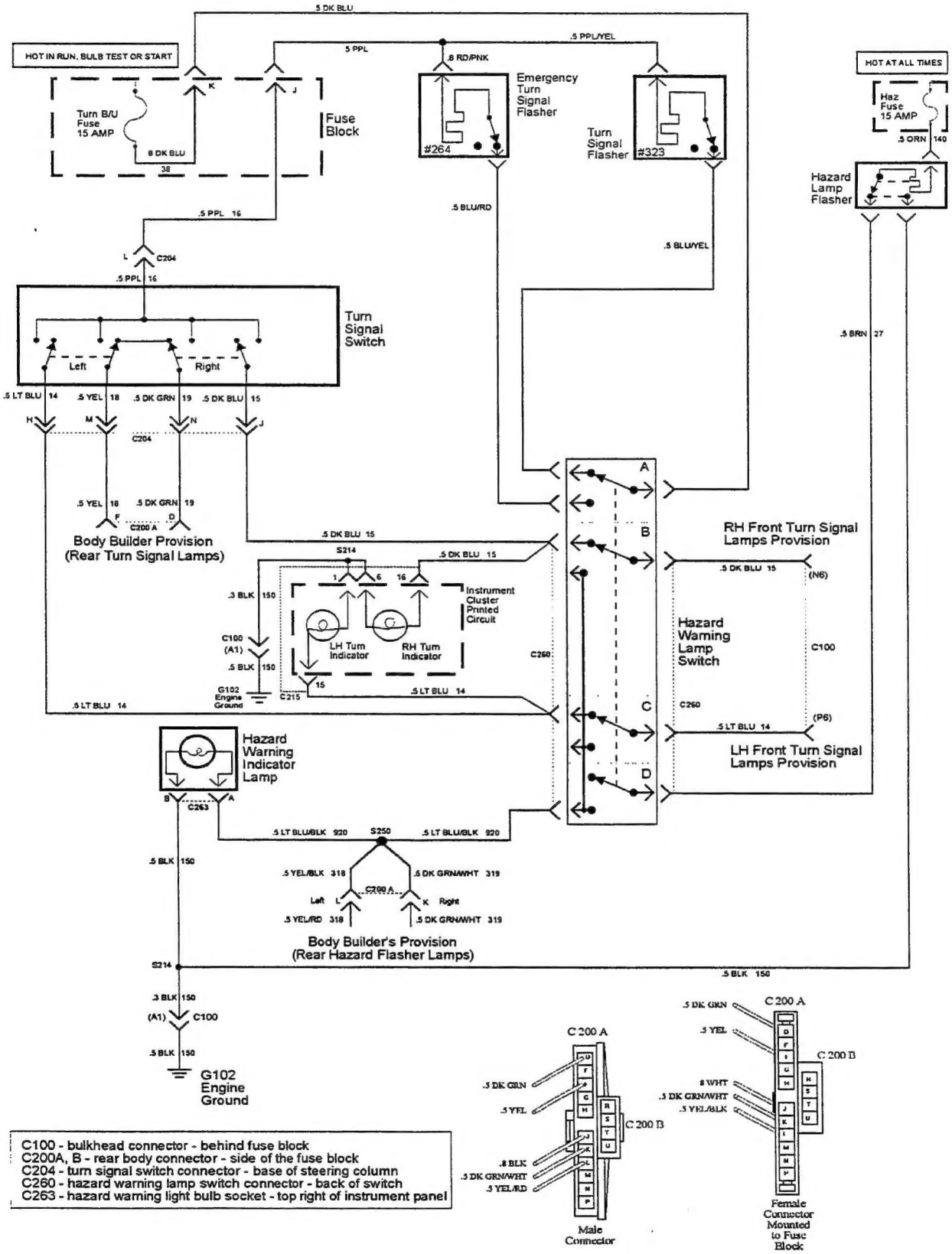


C100 - BulkHead Connector - Behind Fuse Block
C220 - Head Light Connector - Back of head light switch
C200 A - Body Connector - Mounted on side of fuse block

BRAKE LIGHTS

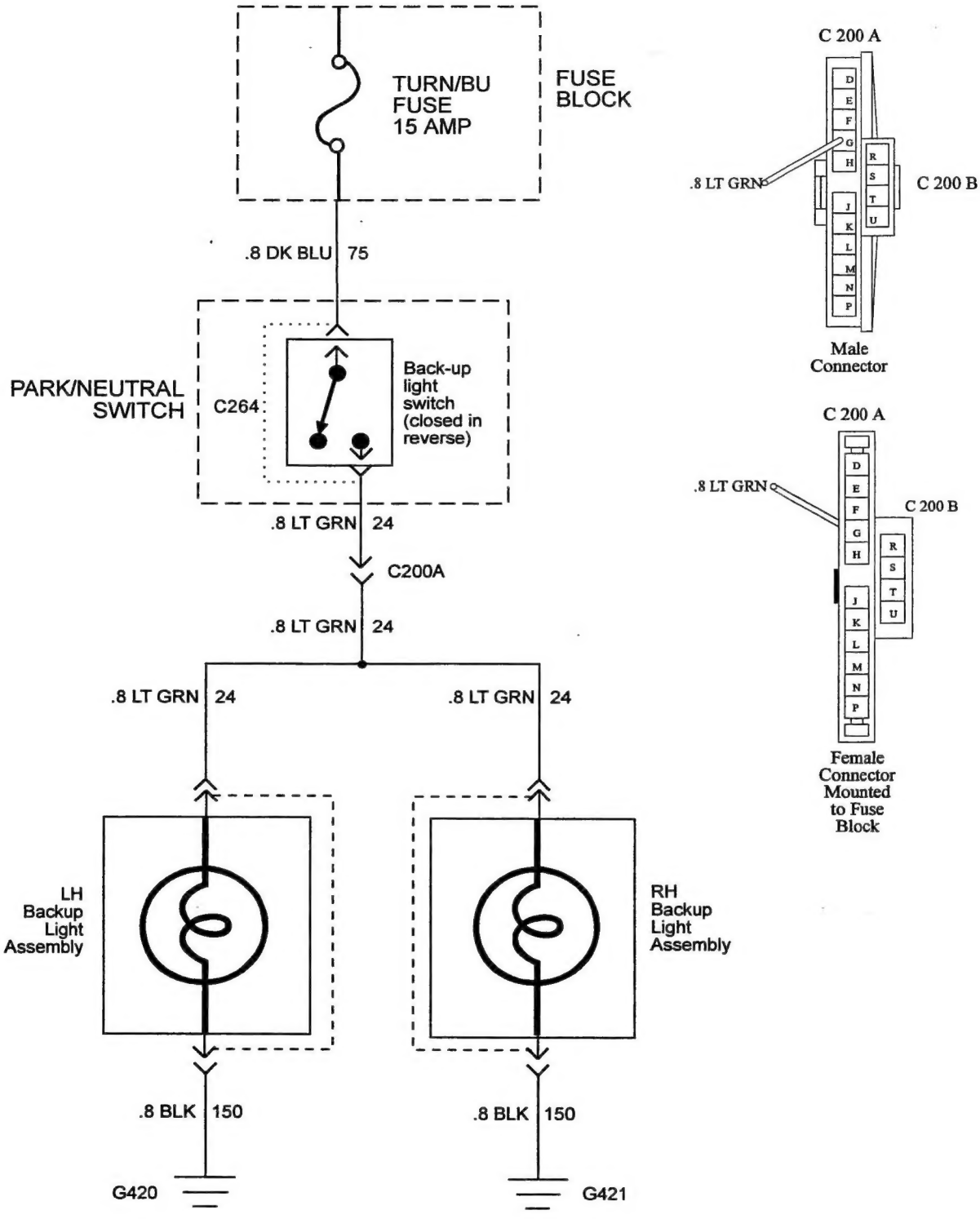


TURN SIGNAL AND HAZARD FLASHERS

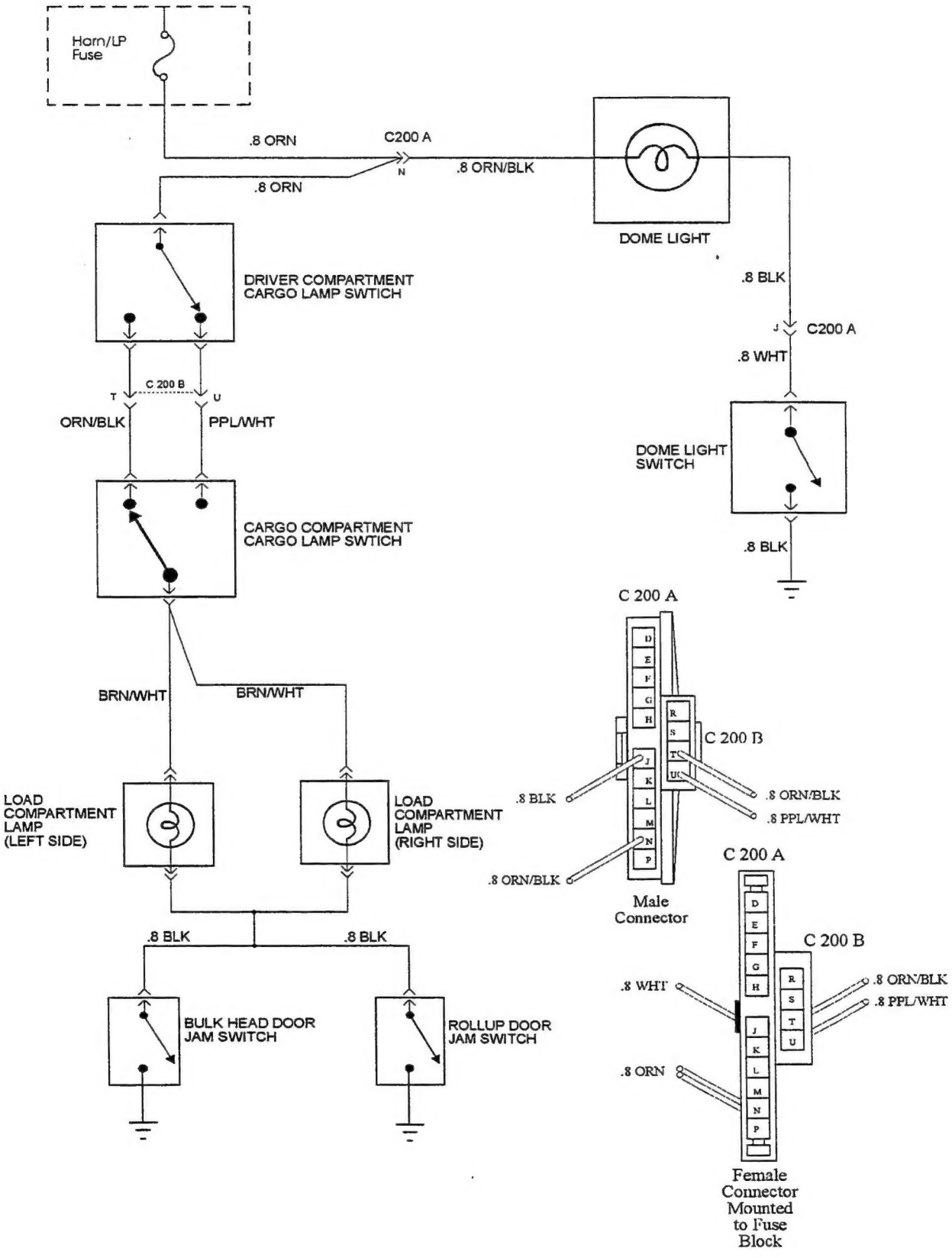


C100 - bulkhead connector - behind fuse block
C200A, B - rear body connector - side of the fuse block
C204 - turn signal switch connector - base of steering column
C260 - hazard warning lamp switch connector - back of switch
C263 - hazard warning light bulb socket - top right of instrument panel

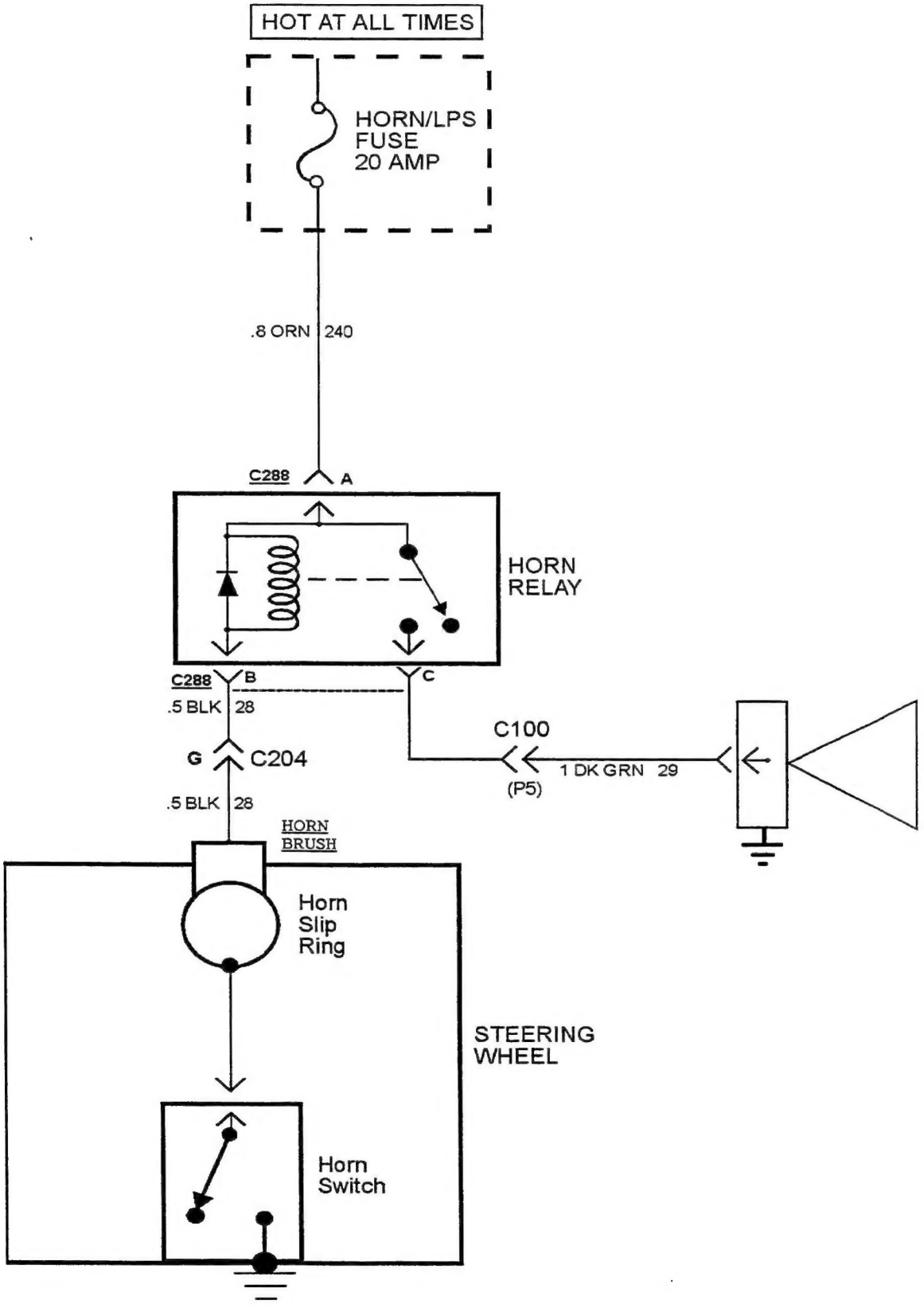
BACKUP LIGHTS



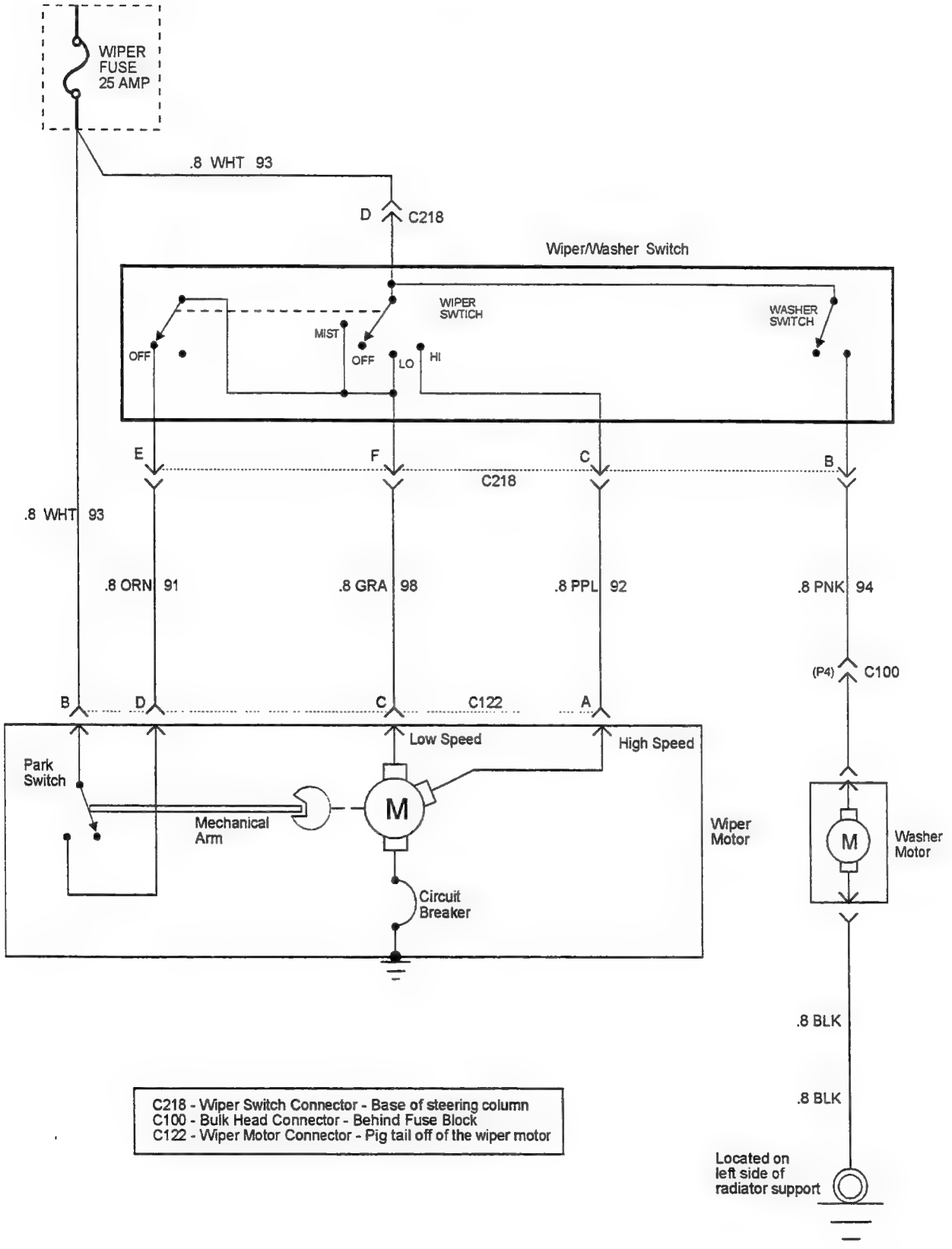
CARGO / DOME LIGHTS



HORN

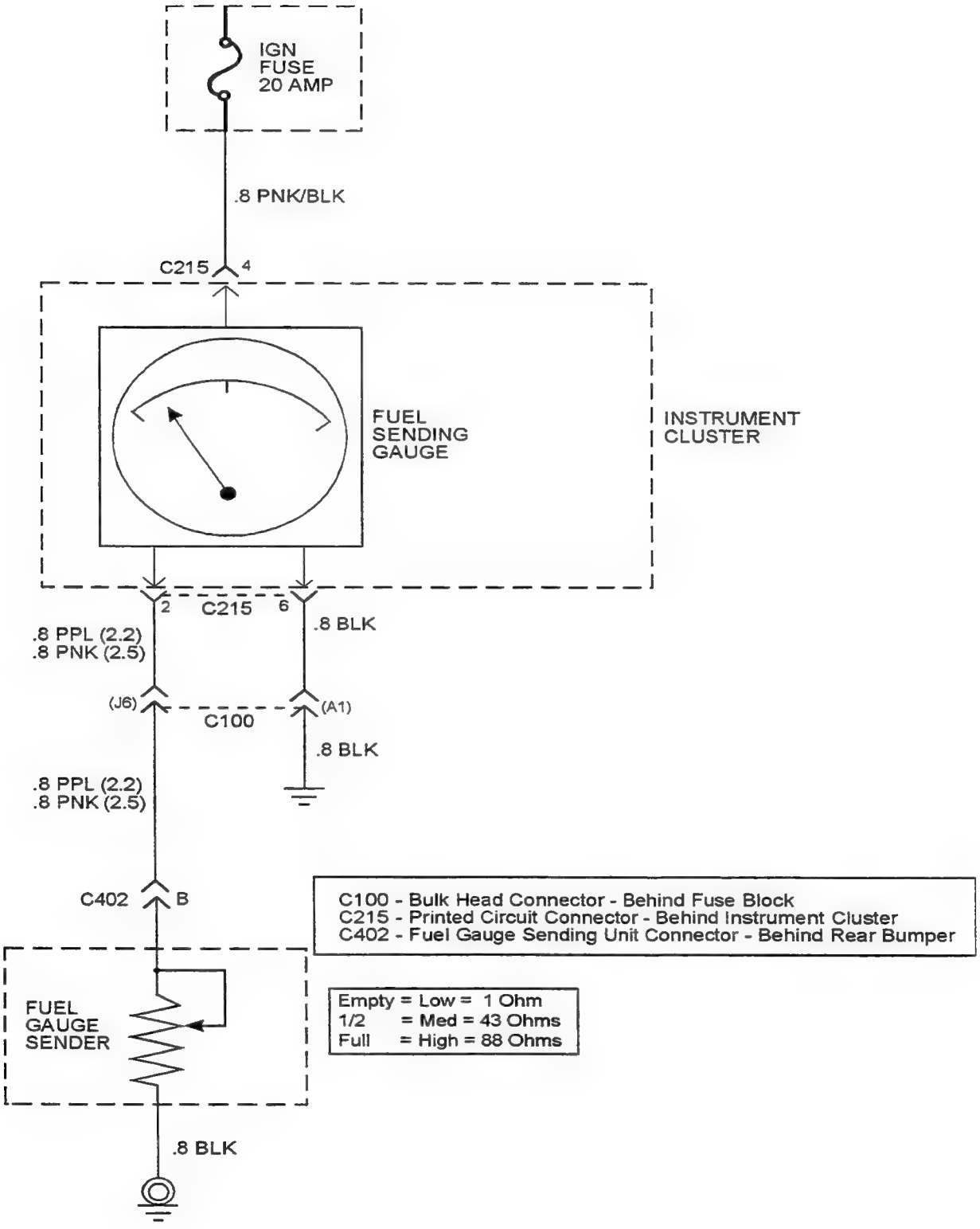

HOT AT ALL TIMES
HORN/LPS
FUSE
20 AMP
.8 ORN 240
C288 A
HORN
RELAY
C288 B
C
.5 BLK 28
G C204
.5 BLK 28
C100
1 DK GRN 29
(P5)
HORN
BRUSH
Horn
Slip
Ring
STEERING
WHEEL
Horn
Switch

WIPERS

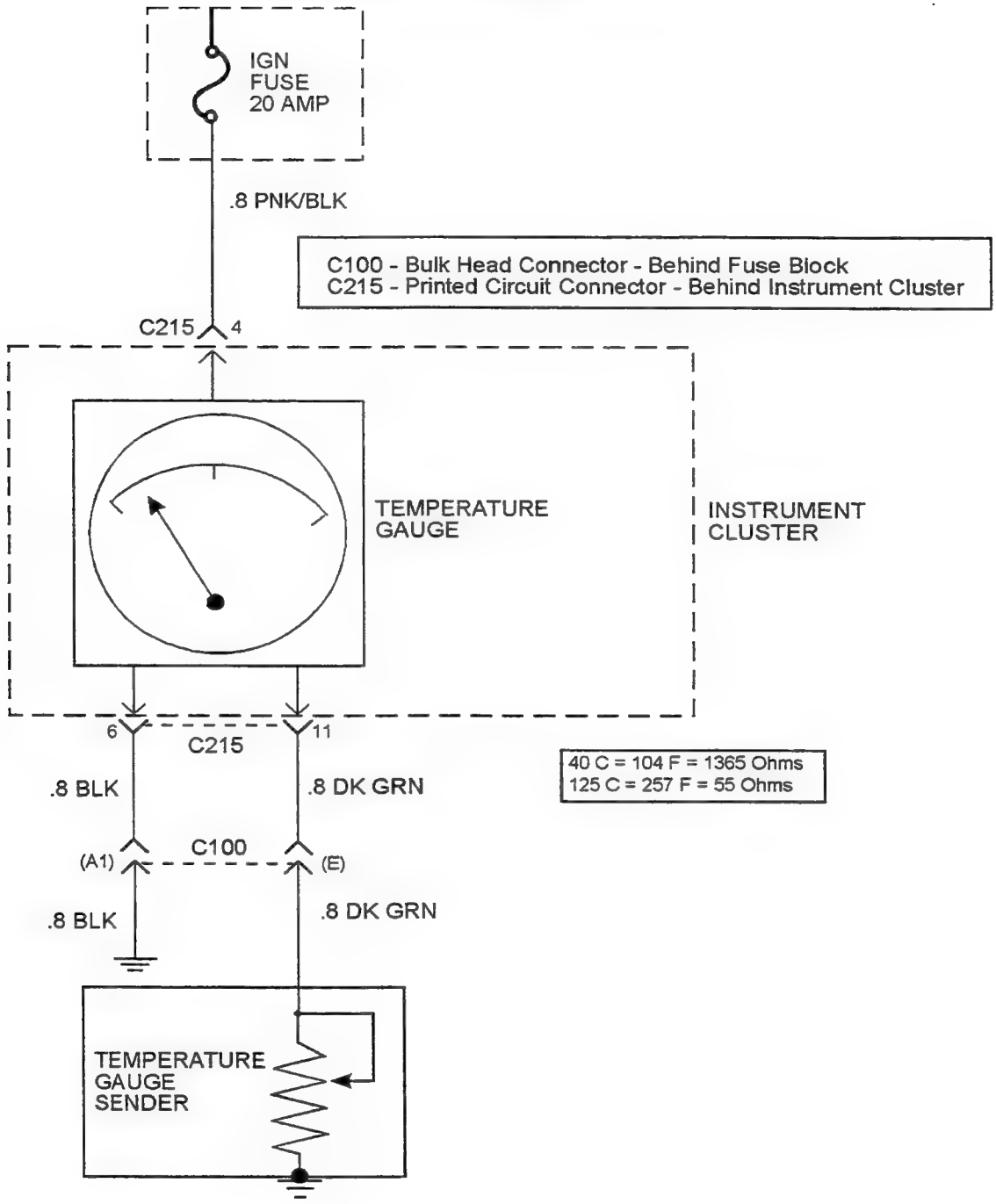


C218 - Wiper Switch Connector - Base of steering column
C100 - Bulk Head Connector - Behind Fuse Block
C122 - Wiper Motor Connector - Pig tail off of the wiper motor

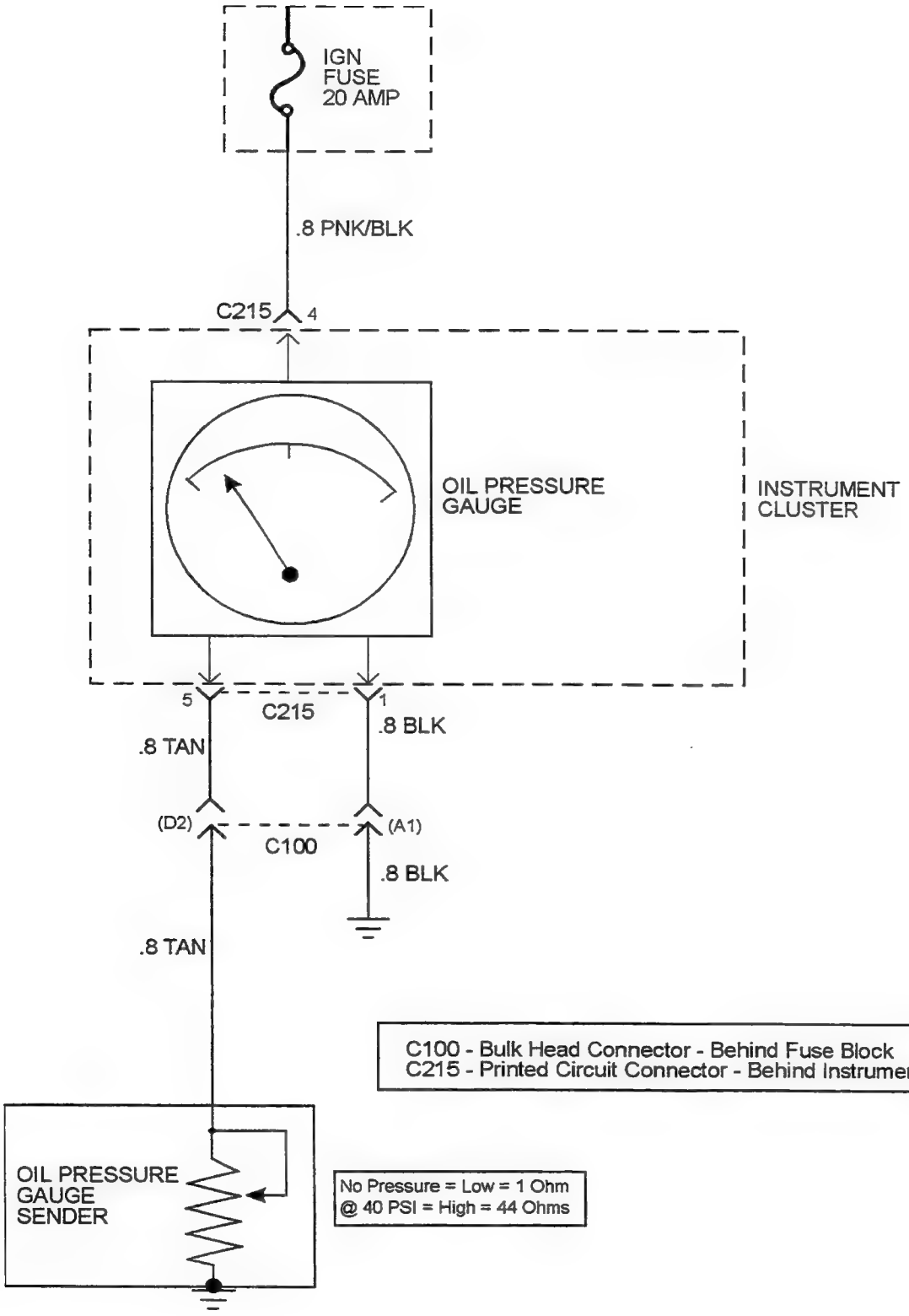
FUEL GAGE


IGN
FUSE
20 AMP
.8 PNK/BLK
C215
4
FUEL
SENDING
GAUGE
INSTRUMENT
CLUSTER
2
C215
6
.8 BLK
.8 PPL (2.2)
.8 PNK (2.5)
(J6)
C100
(A1)
.8 BLK
.8 PPL (2.2)
.8 PNK (2.5)
C402
B
C100 - Bulk Head Connector - Behind Fuse Block
C215 - Printed Circuit Connector - Behind Instrument Cluster
C402 - Fuel Gauge Sending Unit Connector - Behind Rear Bumper
FUEL
GAUGE
SENDER
Empty = Low = 1 Ohm
1/2 = Med = 43 Ohms
Full = High = 88 Ohms
.8 BLK

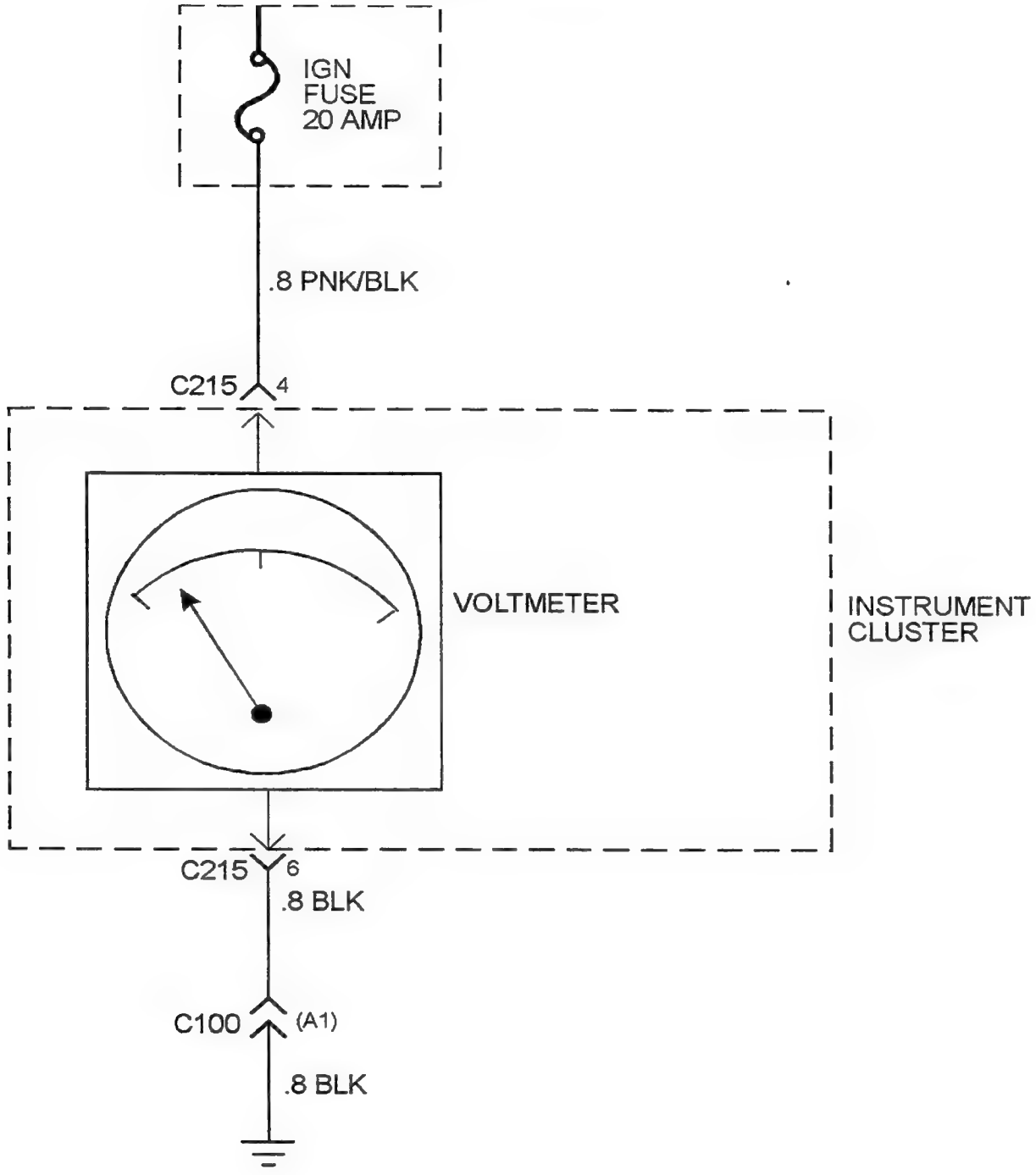
TEMPERATURE GAGE



OIL PRESSURE GAGE

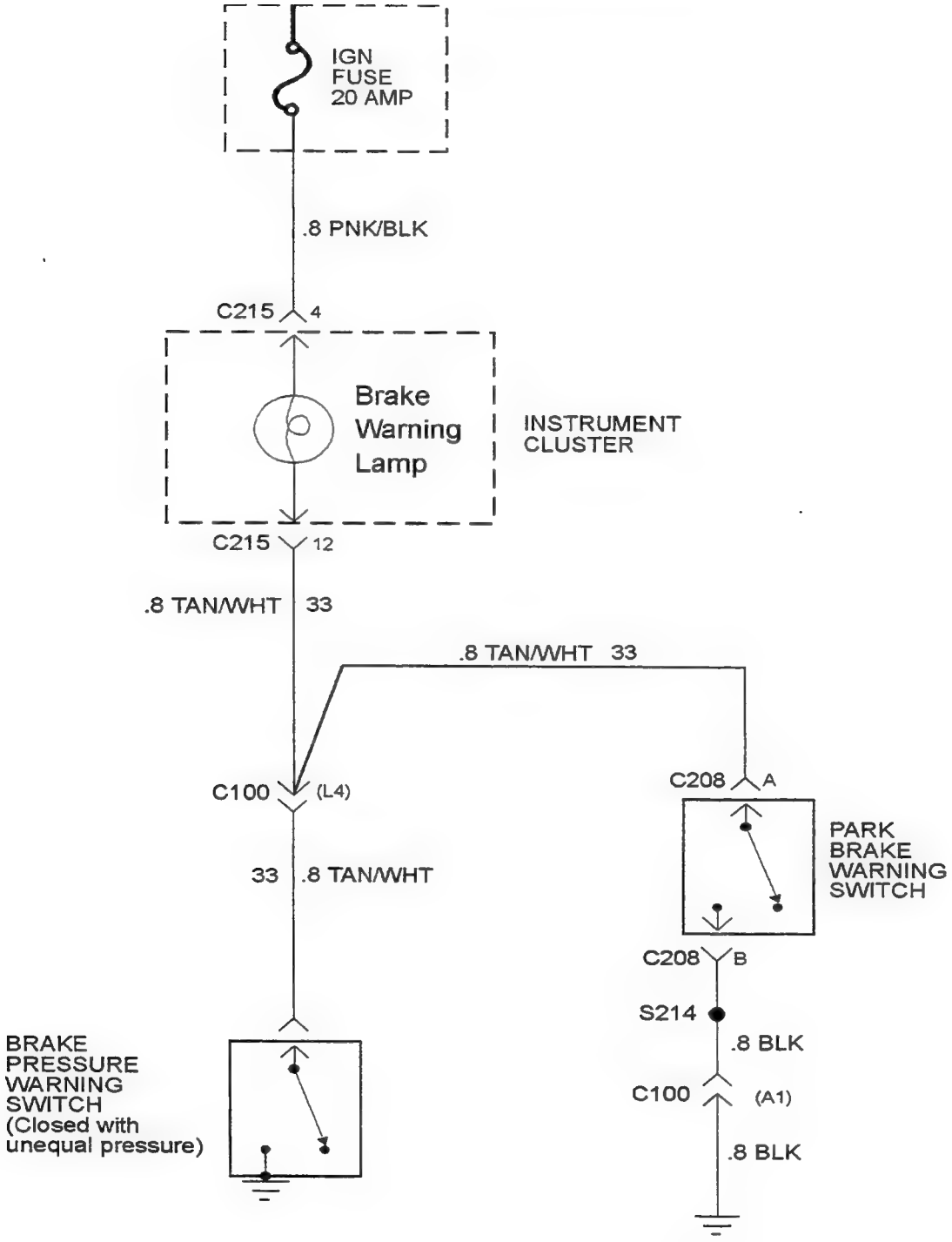


VOLTMETER



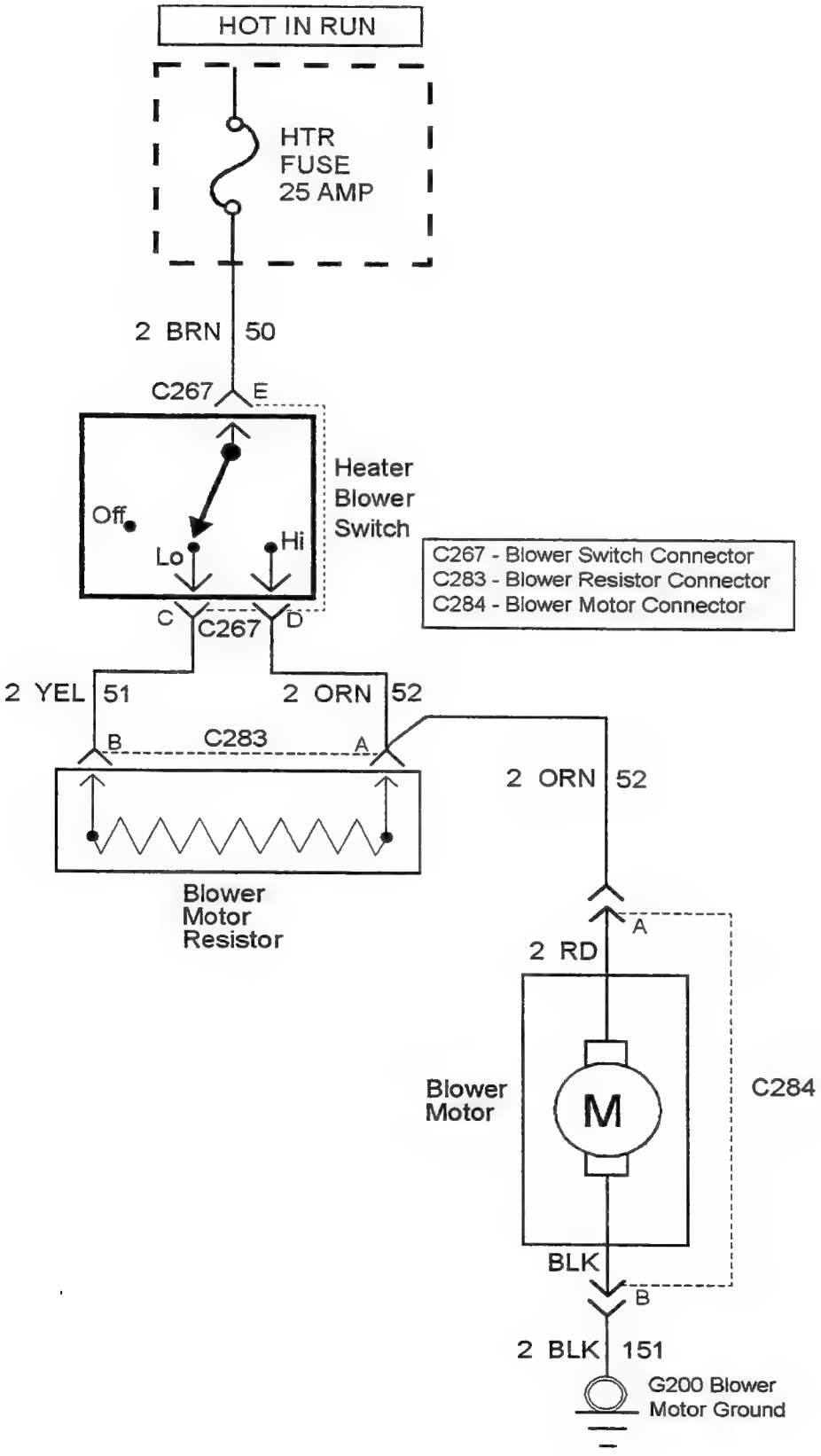
C100 - Bulk Head Connector - Behind Fuse Block
C215 - Printed Circuit Connector - Behind Instrument Cluster

BRAKE WARNING

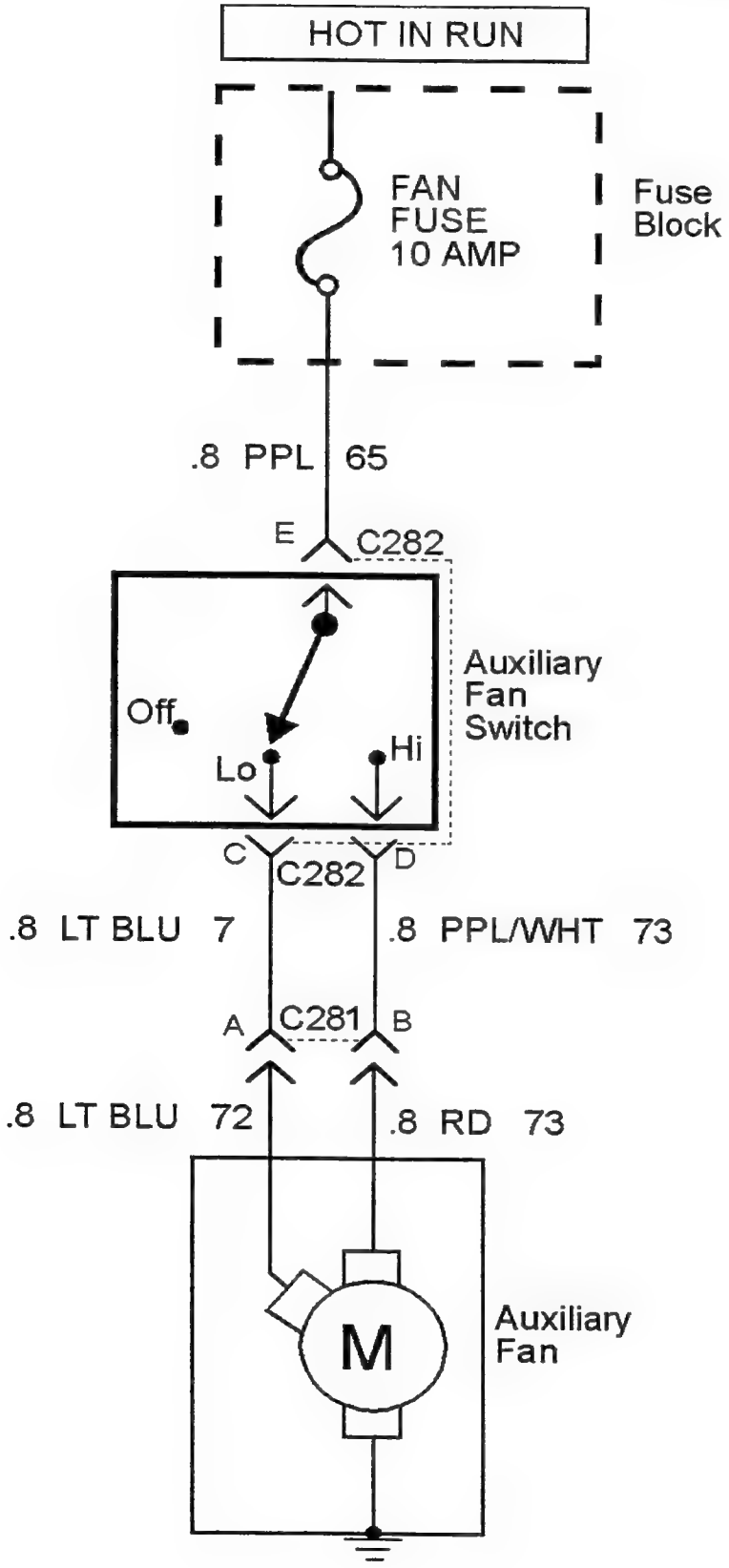


C100 - Bulk Head Connector - Behind Fuse Block
C215 - Printed Circuit Connector - Behind Instrument Cluster

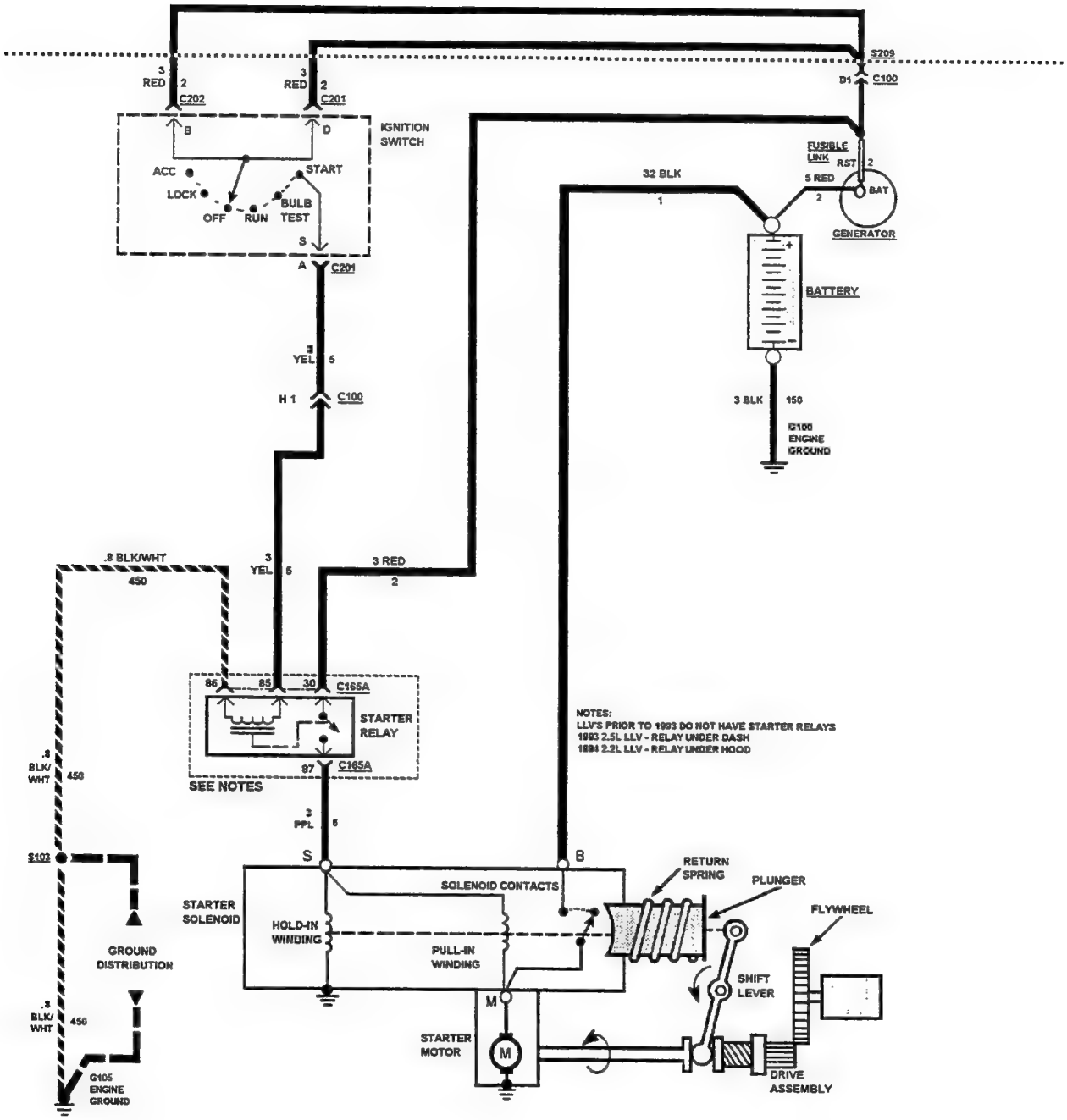
HEATER BLOWER MOTOR



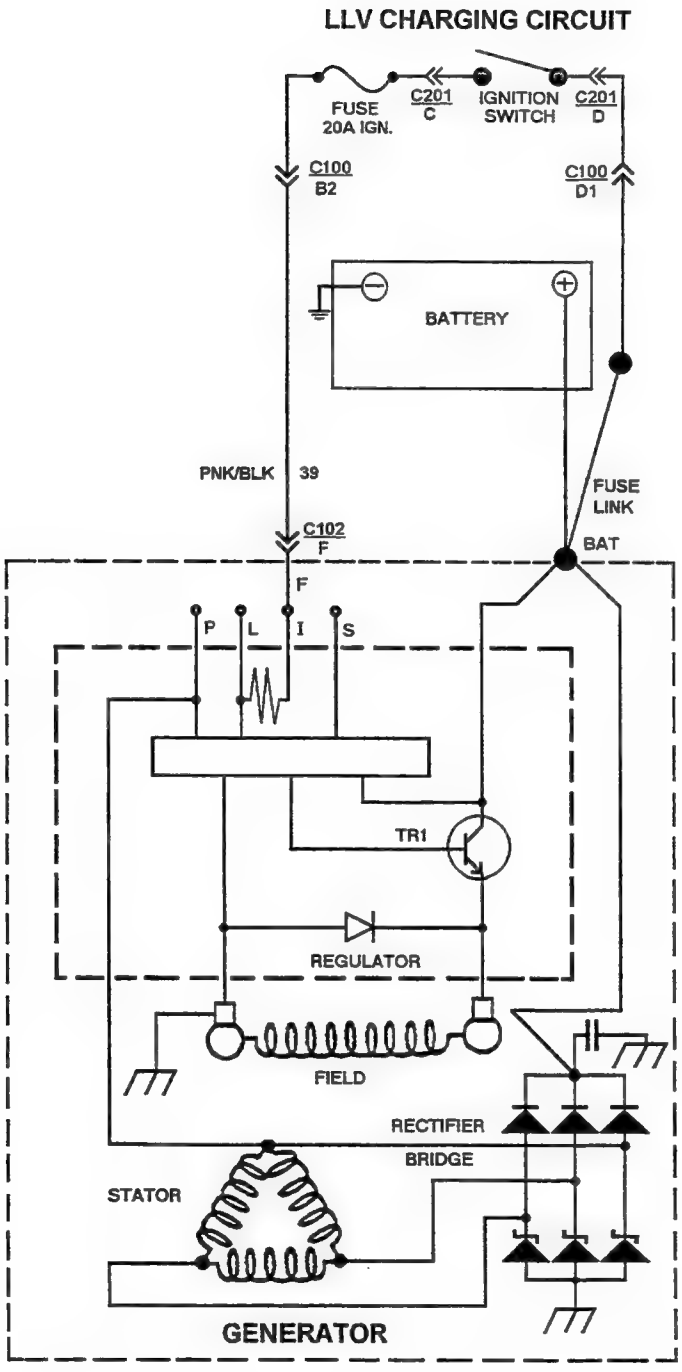
AUXILIARY FAN



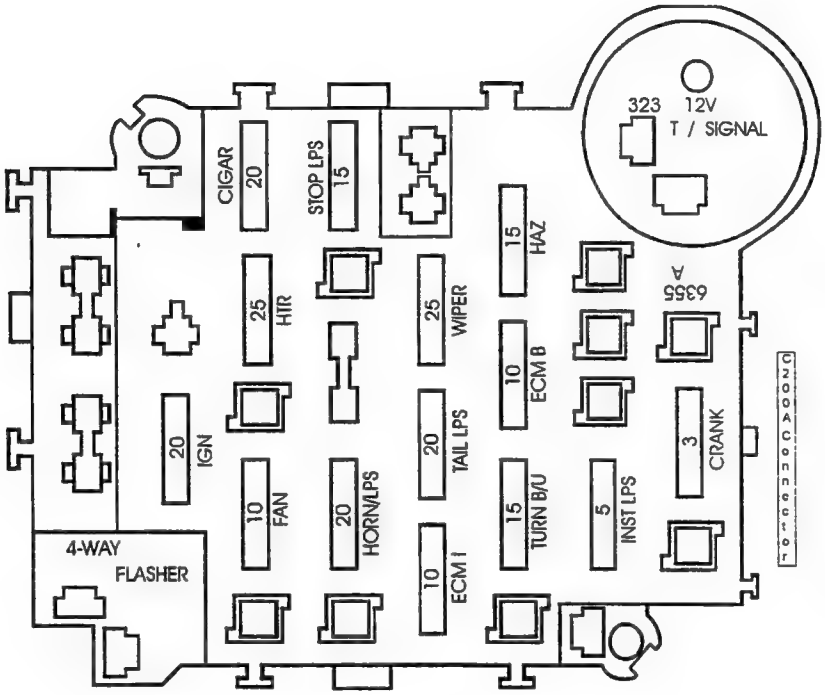
STARTER - VIN 93 AND 94



ALTERNATOR


LLV CHARGING CIRCUIT
FUSE
20A IGN.
C201
C
IGNITION
SWITCH
C201
D
C100
B2
C100
D1
BATTERY
PNK/BLK
39
FUSE
LINK
C102
F
BAT
F
P
L
I
S
TR1
REGULATOR
FIELD
RECTIFIER
BRIDGE
STATOR
GENERATOR

FUSE BLOCK



FUSE IDENTIFICATION

FUSE LOCATION	COLOR / AMPS	HOT CONDITION	DESCRIPTION
IGN	YELLOW / 20	HOT IN START OR RUN	IGNITION SWITCH AND GAGES
CIGAR	YELLOW / 20	HOT AT ALL TIMES	CIGAR LIGHTER
HTR	WHITE / 25	HOT IN RUN	HEATER
FAN	RED / 10	HOT IN START OR RUN	AUXILIARY FAN
STOP LPS	LT BLU / 15	HOT AT ALL TIMES	STOP LAMPS
HORN / LPS	YELLOW / 20	HOT AT ALL TIMES	HORN AND CARGO DOME/LAMPS
WIPER	WHITE / 25	HOT IN ACC OR RUN	WINDSHIELD WIPER / WASHER
TAIL LPS	YELLOW / 20	HOT AT ALL TIMES	LIGHT SWITCH - TAIL / PARK LAMPS
ECM I	RED / 10	HOT IN START OR RUN	POWERTRAIN CONTROL MODULE IGNITION NO. 1
HAZ	LT BLU / 15	HOT AT ALL TIMES	HAZARD LAMPS
ECM B	RED / 10	HOT AT ALL TIMES	ENGINE CONTROL MODULE
TURN B/U	LT BLU / 15	HOT IN ACC OR RUN	TURN SIGNAL FLASHER - BACKUP LAMP SWITCH
INST LPS	TAN / 5	HOT WHEN PANEL AND INTERIOR LAMPS CONTROL SWITCH IS ON. OUTPUT VOLTAGE IS VARIABLE	INSTRUMENT AND PANEL LAMPS
CRANK	PURPLE / 3	HOT IN START ONLY	CRANKING SIGNAL TO ECM (2.5L ONLY)

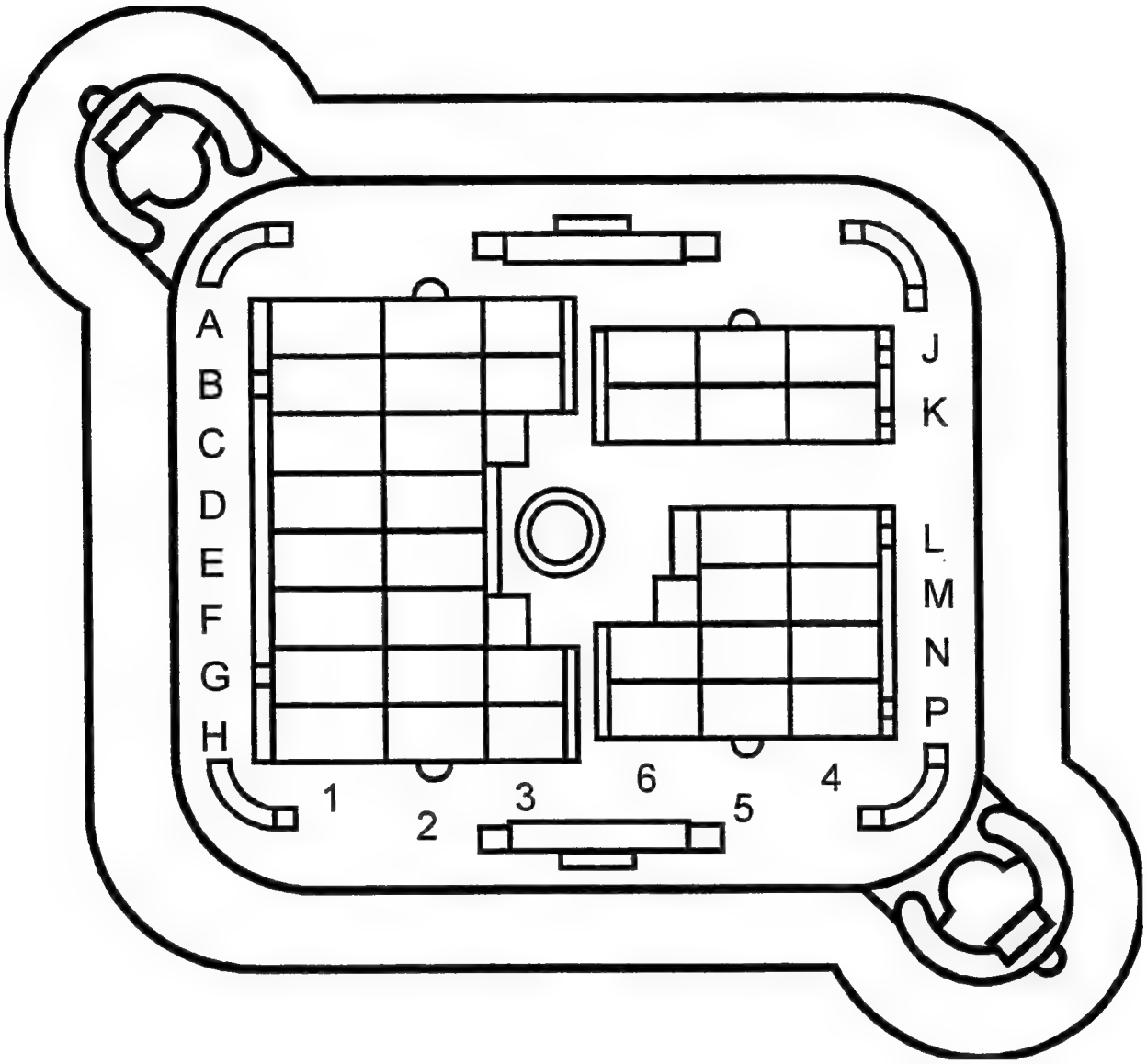
Bulkhead Connector Wire List
2.5L LLV, 1988 - 1993

LOCATION	WIRE/CKT#	DESCRIPTION
A1	Purple 420	TCC Transmission
A2	XXX	
A3	XXX	
B1	Tan/Wht 422	To data link connector, pin F
B2	Pnk/Blk 39	Alternator exciter
B3	XXX	
C1	Pink 3	Ignition module
C2	Pnk/Blk 439 (2)	ECM I Fuse Ignition feed to ECM, EGR solenoid
D1	Red 2	Power from fuse link to ignition switch
D2	Tan 31	Oil pressure sender
E1	Tan/Wht 120	From fuel pump relay to C100 J4
E2	DK GRN 35	Temperature sending unit
F1	RED 2	Power from fuse link to headlight switch
F2	XXX	
G1	Orange 440	PCM power supply, fuel pump relay
G2	XXX	
G3	XXX	
H1	Purple (2)	Starter "S" terminal
H2	PPL/WHT 806	Crank Signal
H3	Black 150	G102 Engine ground
J4	Tan/Wht 120	Fuel pump motor
J5	XXX	
J6	Pink 30	Fuel level sender
K4	XXX	
K5	XXX	
K6	XXX	
L4	Tan/Wht 33 (2)	Brake pressure warning switch
L5	Lt Grn 11 (2)	Headlights high beam
M4	XXX	
M5	Tan 12	Headlights low beam
N4	Brown 9 (2)	Park lights, front
N5	XXX	
N6	Dk Blu 15	Front right turn signal
P4	Pink 94	Windshield washer pump
P5	Dk Grn 29	Horn
P6	Lt Blu 14	Front left turn signal

Bulkhead Connector Wire List
2.2L LLV, 1994
Behind Fuse Block View

LOCATION	WIRE/CKT#	DESCRIPTION
A1	Black 150	G102 Engine Ground
A2	XXX	
A3	XXX	
B1	Tan/Wht 422	To data link connector
B2	Pnk/Blk 39	Alternator exciter
B3	XXX	
C1	Pink 3	Ignition module
C2	Pnk/Blk 439 (2)	PCM,EGR,Inj 1-4; from ECM I fuse
D1	Red 2	Power from fuse link to ignition switch
D2	Tan 31	Oil Pressure Sending Unit
E1	Gray 120	Fuel Pump Motor
E2	DK GRN 35	Temperature sending unit
F1	RED 2	Power from fuse link to headlight switch
F2	XXX	
G1	Orange 440	Fuel pump relay, PCM
G2	XXX	
G3	XXX	
H1	Yellow 5	Starter Relay Coil
H2	XXX	
H3	Purple 420	TCC Transmission
J4	Gray 120	Fuel pump motor
J5	XXX	
J6	Purple 30	Fuel Level Sender
K4	XXX	
K5	XXX	
K6	XXX	
L4	Tan/Wht 33 (2)	Brake pressure warning switch
L5	Lt Grn 11 (2)	Headlights, High Beam
M4	XXX	
M5	Tan 12	Headlights, Low Beam
N4	Brown 9 (2)	Park Lights, Front
N5	XXX	
N6	Dk Blu 15	Front right turn signal
P4	Pink 94	Windshield washer pump
P5	Dk Grn 29	Horn
P6	Lt Blu 14	Front left turn signal

BULKHEAD CONNECTOR, ENGINE COMPARTMENT VIEW



Load (components) or circuit does not operate at full power or does not operate

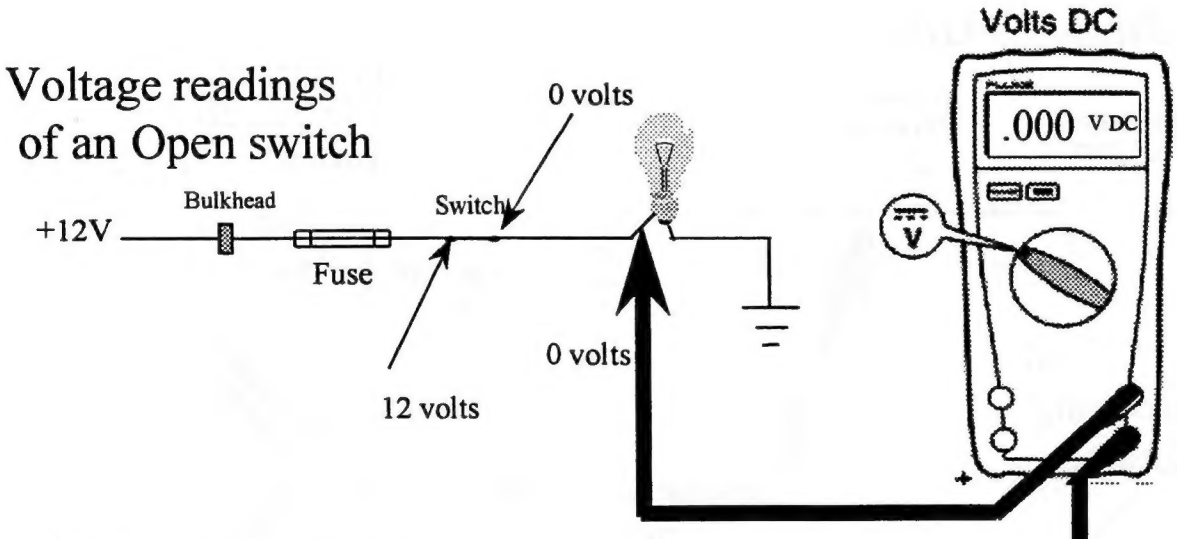
(Disclaimer: There are many ways to troubleshoot any one problem. This is only one way. The more often you use your meter, the more ways you will think of.)

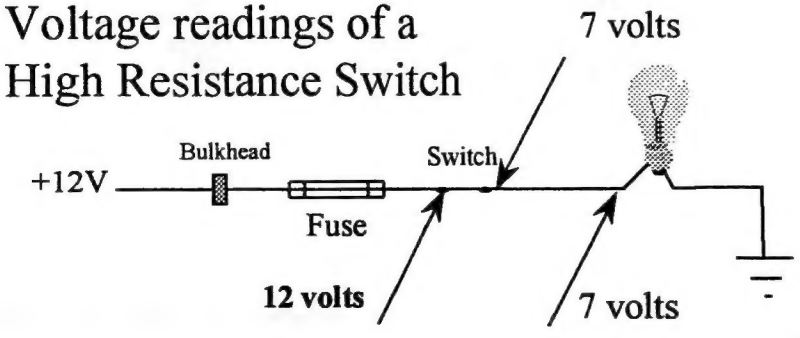
Fault Possible open or high resistance.
(An open will display source voltage up to the break. A high resistance will show a voltage drop at the problem area.)

Method of troubleshooting: Turn the circuit on, even if it does not come on.

1. Check the voltage to the power side of load. Should be source voltage.
   If less: make further checks upstream towards the positive battery post. When the source voltage is found, the problem is located between the source reading and the last low or zero voltage reading.
2. Check the voltage on the ground side of the load. Should be .5 volts or less.
   If more: make further checks downstream towards the negative battery post. When the low voltage is found, the problem is between the low reading and the last high reading.

If both the power side and ground side have good readings, the component is open or high resistance itself, replace it.





Load Operates When It Should Not

(An item can not be turned off or is turned on with the operation of a second circuit.)

Fault: Short to power if switch provides power, short to ground if switch provides ground.

Methods of troubleshooting Determine if problem occurs always, or with a second circuit.

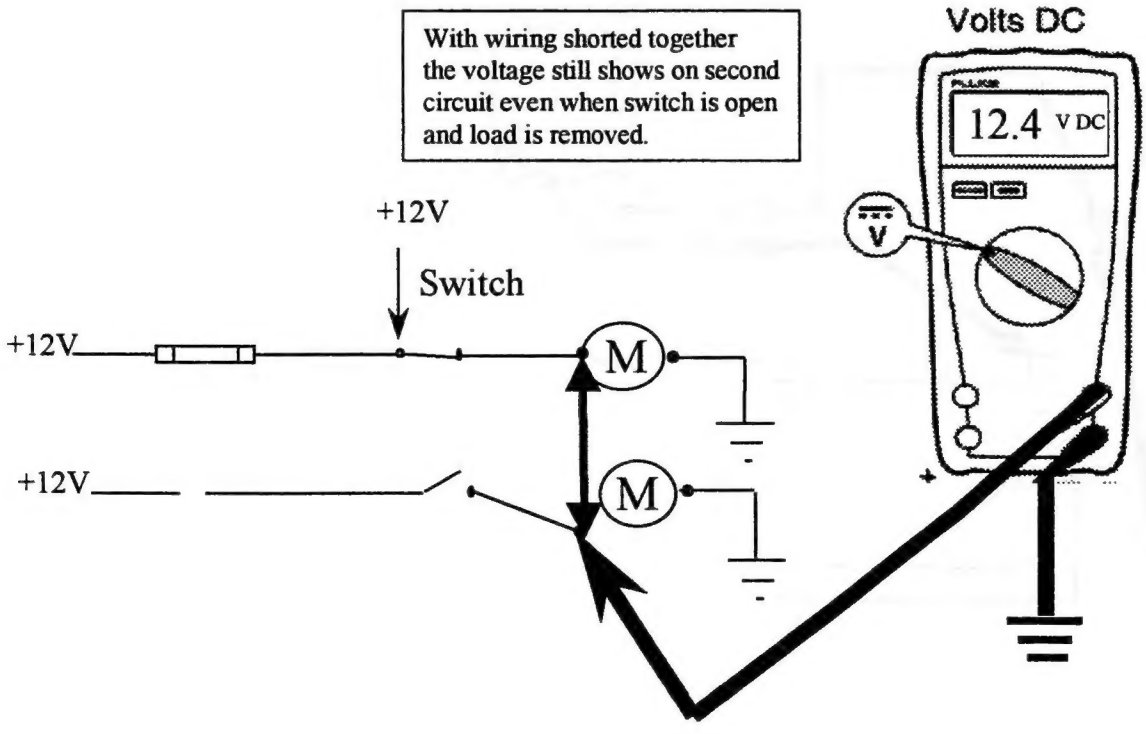
Component always on: The switch could be shorted, disconnect it. Does the circuit still operate?

If NOT, Connect ohmmeter across the switch and operate the switch to see if it is closed at all times.

If YES, use a wiring diagram to identify the path of the faulty circuit. If the switch for the load is on the power side of the circuit, you have a short to power. If the switch is on the ground side of the circuit, you have a short to ground.

Component on when a second circuit is operated; These two circuits are touching somewhere between their switches and loads. They must have a path together or share a plug, switch or load.

Use a wiring diagram to identify the path of each problem circuit. You may need to turn on one of the two circuits and check for voltage on the second circuit while disconnecting different parts of the related path.



Battery Runs Down

For more details see the battery section.

If test light lights or the amp reading is too high:

Pull fuses one at a time, checking the reading or light each time one is pulled. If a fuse pulled drops the reading to specs or light out, then you have just disconnected the problem circuit.

Trace the fused circuit in the wiring diagrams. While watching the drain, disconnect the switches in the circuit one at a time. The reading will drop if a low resistance switch is removed from the circuit. If drain remains, the problem is in the wiring or connections between the fuse and the switch/s.

If no fuse drops the current or turns out the light, identify all circuits that do not use the fuse panel. (Alternator, headlights, ignition, etc.) The alternator should be unplugged or the main power line removed while leaving all the other wires together. If no change in the drain go to each of the other items switches and disconnect them one at a time. The item that drops the current or turns off the light is the low resistance item and should be replaced.

If no item creates this change, you have a wiring problem. The bulkhead connector should be split to see if the problem is in the engine compartment or the cab. You are mainly on a visual chase now. Look for screws into the wiring, etc.